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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,622	12/09/2003	Michael Kowalchik	EMC-01-102CIP1	4760

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EXAMINER	
CHACE, CHRISTIAN	

ART UNIT	PAPER NUMBER
2189	

DATE MAILED: 06/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/731,622	KOWALCHIK ET AL.	
	Examiner	Art Unit	
	Christian P. Chace	2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30-32,34-43,45 and 47-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30-32,34-43,45 and 47-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office action has been issued in response to request for reconsideration filed 16 May 2006. Claims 30-32, 34-43, 45, and 48-50 are pending. Applicants' arguments have been carefully and respectfully considered, but they are not persuasive with respect to the art rejections. Accordingly, this action has been made FINAL.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 30-32, 34-43, 45, and 47-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brant et al (US Patent #5,805,787) in view of Rao (US Patent #5,845,104).

With respect to independent claim 30, Brant et al disclose a data storage device is disclosed in figure 1.

A device interface for receiving data access requests is disclosed in figure 1 as #11.

A device housing conforming to a standard form factor is disclosed in column 1,line 42, e.g.

A plurality of non-volatile memory devices housed within the device housing is disclosed in figure 1, #16.

A controller that accesses the non-volatile memory devices in response to the received data access requests is disclosed in figure 1, #20.

The difference between the instant claim and Brant et al is the explicit recitation of the plurality of NV memory devices being selected from the group consisting of flash memory...etc.

Rao discloses the use of Flash memory in column 8, line 33.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Brant et al and Rao before him/her, to utilize the flash memory of Rao in the system of Brant et al because flash memory has the advantage of good read access time, better write access time than a hard disk, and it preserves the contents after power has been removed, as discussed by Rao in column 8, lines 33-36, e.g.

With respect to claim 31, Brant et al disclose the device interface comprising an interface configured to conform to a protocol is disclosed in column 6, lines 39-44, where the protocol is "SCSI-type connections."

With respect to claim 32, Brant et al disclose the protocol comprising at least one of the following: SCSI, Fibre Channel, and "Infiniband" is disclosed in column 6, lines 39-44, which specifically discloses SCSI.

With respect to claim 49, Brant et al disclose the plurality of non-volatile memory devices including mechanical or "microelectromechanical" is disclosed column 1 as disks.

With respect to claim 35, Brant et al disclose the controller comprising a controller configured to implement or access the more than two disks in a RAID scheme is disclosed in column 5, lines 34, 36, and 44, in general. RAID stands for, "Redundant Array of Independent Disks." In this case, column 5, line 59 recites "Controller 20 can include independent paths to write data to its memory in a mirrored fashion." Mirroring is redundant storage of data. The cache being an array is disclosed in column 4, line 15, for example. Figure 1 clearly shows separate disks, and, therefore, independent disks. Therefore, RAID is explicitly disclosed embodied in the invention of Brant et al.

With respect to claims 36 and 48, Brant et al disclose the scheme implemented by the controller comprising a RAID scheme is disclosed as discussed supra with respect to instant claims 10, 21, and 28. The RAID scheme being independent of a hierarchically higher RAID controller that sends the data storage device data is discussed in column 5, lines 12-35. By stating that the system of Brant et al, which includes RAID, as discussed in the cited passage, that the storage subsystem can fill **several** intermediate slots in the hierarchy, as stated in line 31 of the instant passage, Brant et al anticipates hierarchically higher RAID controllers.

With respect to claim 37, said data storage device further comprising a cache manager is disclosed in figure 1 as #20, and it's operation is further discussed in column 6, line 35, for example.

With respect to claim 38, Brant et al disclose the cache manager comprising a manager configured to perform at least one of the following: translate an address of a different storage device (for example, back-end storage), cache data included in a write

request, load data from the different storage device, and remove cached data is disclosed in column 6, line 35, for example. The controller #20 in Brant et al performs the functions of the instantly claimed cache manager as well as the instantly claimed controller of instant claim 1.

However, it happens that all of the following are anticipated by the cited prior art of record, with the instant claim limitations in parenthesis along with the relevant citation in Brant et al:

Requesting data from a back-end storage system (which inherently requires translating the address of that different storage system) (see column 6, lines 50-51);

Retrieving requested data (caching data included in a write request and loading data from the different storage device) from the [at least two] disks [making up the cache] (see column 4, lines 9-19);

Sending data to the back-end system for writing (column 6,lines 50-51);

Determining the location of back-end system data (more address translation) within the [at least two] disks [making up the cache] (column 4, lines 32-48).

Removing data from the [at least two] disks [making up the cache] (removing cached data) (column 4, lines 42-44).

With respect to claim 39, Brant et al disclose a controller card that includes the controller and connections available to couple with more than one storage card that provides access to the [a] the [at] least two of the [disk] drives is disclosed in column 5, lines 41-45, which discloses ASIC based daughter cards which the disclosed products of Brant et al can be based on. These products of Brant et al are what examiner is

rejecting the instant claims over, so it logically follows that "these products" apply to the instant claim language.

With respect to claim 40, the storage card comprising a card having at least one parallel interface to a collection of the drives is disclosed column 5, line 30 as well as lines 41-45, for the reasons as discussed supra with respect to claim 15.

With respect to claim 41, Brant et al disclose the connection between the controller and storage card comprising a serial connection is disclosed in column 6, line 41, as "SCSI-type connections." SCSI has a serial as well as a parallel "type" connection, and, therefore, the cited passage anticipates the instant claim language.

With respect to claim 42, the controller comprising a bank interface that routes data requests to the appropriate bank of drives is disclosed in figure 1 as #15, as discussed in column 5, lines 54-56, for example.

With respect to independent claim 43, a data storage system is disclosed in figure 1.

At least one first data storage device having a platter size of at least 3.5 inches in diameter is disclosed in column 5, line 39. The hierarchy listed in column 5, from line 12 to line 28, shows the lower levels of the hierarchy having higher capacity disks. To increase capacity on a disk that uses a standard method of data storage, one must, inherently, increase the physical size, or platter size, of that disk.

A device interface for receiving data access requests is disclosed in figure 1 as #11.

A device housing conforming to a standard form factor is disclosed in column 1,line 42, e.g.

A plurality of non-volatile memory devices housed within the device housing is disclosed in figure 1, #16.

A first controller that accesses the non-volatile memory devices in response to the received data access requests is disclosed in figure 1, #20.

A second controller that "coordinates" data access to the at least one first data storage device and the at least one second data storage device is disclosed in figure 1, #24.

The difference between the instant claim and Brant et al is the explicit recitation of the plurality of NV memory devices being selected from the group consisting of flash memory...etc.

Rao discloses the use of Flash memory in column 8, line 33.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Brant et al and Rao before him/her, to utilize the flash memory of Rao in the system of Brant et al because flash memory has the advantage of good read access time, better write access time than a hard disk, and it preserves the contents after power has been removed, as discussed by Rao in column 8, lines 33-36, e.g.

With respect to independent claim 45, a method of servicing data access requests at a data storage device is disclosed in the abstract, e.g.

Receiving data access requests at a device interface is discussed in column 6, lines 39-44, for example. The host sends and receives data through interface #11 in figure 1.

Accessing a plurality of disk drives (figure 1, #22) with a standard from factor (discussed supra with respect to claim 30, e.g.) in response to the received data access requests is disclosed in column 6, lines 39-48.

The difference between the instant claim and Brant et al is the explicit recitation of the plurality of NV memory devices being selected from the group consisting of flash memory...etc.

Rao discloses the use of Flash memory in column 8, line 33.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Brant et al and Rao before him/her, to utilize the flash memory of Rao in the system of Brant et al because flash memory has the advantage of good read access time, better write access time than a hard disk, and it preserves the contents after power has been removed, as discussed by Rao in column 8, lines 33-36, e.g.

With respect to independent claim 47, a data storage device is disclosed in figure 1.

A device interface for receiving data access requests is disclosed in figure 1 as #11.

A device housing conforming to a standard form factor is disclosed in column 1,line 42, e.g.

A plurality of non-volatile memory devices housed within the device housing is disclosed in figure 1, #16.

A controller that accesses the non-volatile memory devices in response to the received data access requests is disclosed in figure 1, #20.

The controller comprising a controller configured to implement or access the more than two disks in a RAID scheme is disclosed in column 5, lines 34, 36, and 44, in general. RAID stands for, "Redundant Array of Independent Disks." In this case, column 5, line 59 recites "Controller 20 can include independent paths to write data to its memory in a mirrored fashion." Mirroring is redundant storage of data. The cache being an array is disclosed in column 4, line 15, for example. Figure 1 clearly shows separate disks, and, therefore, independent disks. Therefore, RAID is explicitly disclosed embodied in the invention of Brant et al.

The difference between the instant claim and Brant et al is the explicit recitation of the plurality of NV memory devices being selected from the group consisting of flash memory...etc.

Rao discloses the use of Flash memory in column 8, line 33.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, having the teachings of Brant et al and Rao before him/her, to utilize the flash memory of Rao in the system of Brant et al because flash memory has the advantage of good read access time, better write access time than a hard disk, and it preserves the contents after power has been removed, as discussed by Rao in column 8, lines 33-36, e.g.

With respect to independent claim 49, the limitations have been discussed and anticipated supra with respect to claims 30 and 33, e.g.

With respect to independent claim 50, the limitations have been addressed supra with respect to claim 30 as well. Examiner notes herein that with respect to the instant claim, examiner interprets the non-volatile memory device to be the disk drive, therefore inherently "emulating a disk drive access."

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brant et al and Rao as applied to claim 1, upon which the instant claims depend, above, and further in view of Eckerd et al (US Patent #6,078,498).

Brant et al and Rao teach the data storage device as claimed in claim 30 of the instant application.

The difference between Brant et al and Rao and the instant claims are the explicit recitations of a housing, the housing having one of the following form factors: standard, half-height, and low-profile.

However, Eckerd et al disclose a top cover cooperating with the base deck to form an internal, scaled environment for the disc drive in column 3, lines 22-25. This is a housing. In column 6, lines 18-30, Eckerd et al disclose that housing to be a standardized form factor, including low profile, nominal, and half-height.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, having the teachings of Brant et al, Rao, and Eckerd et al before him/her, to utilize the housing and form factors of Eckerd et al in the invention of Brant et al and Rao, because smaller form factor disk drives permit disk subsystems to exploit

performance advantages of having more disks to service requests in parallel, as discussed by Brant et al in column 1, lines 42-45, and because the relative configurations of the mounting plate and chassis can vary depending upon requirements of a given application, as discussed in column 5, lines 15-18 of Eckerd et al.

Response to Arguments

Any rejections not repeated herein have been withdrawn.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re*

Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation is clearly present in the reference as noted in the rejection supra.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian P. Chace whose telephone number is 571.272.4190. The examiner can normally be reached on MAXI FLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald Bragdon can be reached on 571.272.4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Christian P. Chace
Primary Examiner
Art Unit 2189